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MINOR FORMS OF NORTH AMERICAN SPECIES OF *ROSA*

WALTER H. LEWIS[1]

During the study of the North American rose species east of the Rocky Mountains, several unique and distinct forms have been observed. Variants include: individuals with more than five petals in each flower; those with white rather than pink petals; specimens having unarmed floral stems where armature is typical; and those with glandular-hispid hypanthia and pedicels when the expression for these characters is normally eglandular. Since their distinctiveness eliminates any possible confusion in naming them, since transplant studies have shown that the forms are not expressions of environmental modification, and since they may be of considerable importance to other biological disciplines (plant breeding, horticulture), it is felt that natural variations such as these should be given nomenclatural recognition at the rank of form. These several variations are doubtless the result of different types of genetic situations such as gene mutations, gene combinations controlling expression in certain cases (as probably with armature), and others.

With the new taxa are included new combinations that have been modified in view of the evidences obtained from a revision of the North American roses (Lewis, 1957a).

1. **R. nitida** Willdenow, f. **spinosa** f. nov.

R. carolina L., var. *setigera* Crépin. RHODORA **2**: 113 (1900) pro syn.
R. carolina x *R. nitida* Crépin. RHODORA **2**: 113 (1900).
R. nitida x *R. palustris* Rydberg. N. Am. Fl. **22**: 496 (1918).
? *R. nitida* x *R. virginiana* Rydberg. N. Am. Fl. **22**: 502 (1918).

[1] The Blandy Experimental Farm, University of Virginia. Present address: Department of Biology, Stephen F. Austin State College, Nacogdoches, Texas.

Caulis floreus armatus setis tenuibus et amplificatis infrastipulatis spinis saepe inparem. Floral stems armed with fine bristles and enlarged infrastipular thorns, often in pairs. Very rarely these stems are without the bristles typical of *R. nitida* and have only infrastipular thorns. The kind of armature is the only certain way in which the form may be differentiated from *R. nitida*.

HOLOTYPE.—Wilton, Franklin County, Maine. *M. L. Fernald* 11 Aug. 1894 (GH).

Both Crépin (1900) and Rydberg (1918) believed f. *spinosa* to be a hybrid between *R. palustris* Marshall and *R. nitida*. Considering the success of many artificial hybrids between most diploid Cinnamomeae species (Erlanson 1934), such a cross could conceivably be possible in nature. The F_1 generation might even be male fertile as, for example, has been found in the progeny of *R. Woodsii* x *R. blanda* and *R. blanda* x *R. pisocarpa* crosses (Flory 1950). The small amount of abortive pollen (16%) found from a specimen of f. *spinosa* collected at Orono, Maine, would add evidence to this opinion. The difficulty with this approach arises, however, when it is realized that one of the parents, *R. palustris*, is not known from Newfoundland or central and northern Nova Scotia (some specimens from the latter province have been confused with *R. palustris*, but they are *R. virginiana* Miller). Since typical specimens of *R. nitida*, f. *spinosa* have been examined from Newfoundland at St. George Bay and at St. John's, it hardly seems possible that the form is a result of a cross between *R. palustris* and *R. nitida* when the variation is found in a region separated by hundreds of miles of water from one of the parents. It has been pointed out to the author, however, that a bird might transport the hybrid fruit from an area where such a hybrid is possible and deposit it in an area some distance from one of the parents. Although such an event would explain the occurrence of the form in Newfoundland, there is no evidence as yet to support this theory. Until *R. palustris* is definitely established as native to Newfoundland, experimental hybridization produces a phenotype similar to f. *spinosa*, or until bird migration is known to be a significant factor here, the form is considered a non-hybrid variation of *R. nitida*.

Rosa nitida x *R. virginiana* of Rydberg (1918) tentatively has been placed in synonymy under *R. nitida*, f. *spinosa*. Erlanson's

(1934) data showed that artificially produced F_1 plants from these species were highly sterile—a condition not apparent in the pollen of f. ***spinosa*** from Orono, Maine. This plant is morphologically similar to those cited by Rydberg as representative of the hybrid, ***R. nitida*** x ***R. virginiana***.

Selected specimens examined:—CANADA. NEWFOUNDLAND: St. John's, *Robinson & Schrenk*, 3 Aug. 1894! (GH). QUEBEC: Stanstead Co.: Magog, *Pease 728* (GH). UNITED STATES. MAINE: Franklin Co.: Wilton, *M. L. Fernald*, 11 Aug. 1894 (as *R. carolina* x *nitida* ? by Crépin; as *R. nitida* x *palustris* by Rydberg; as *R. palustris* ? by Fernald) HOLOTYPE (GH). Kennebec Co: Pine Point, Scarboro, *Hyland 321* (MAINE). Penobscot Co.: Bangor bog, Orono, *Fernald 2958* (MAINE). Piscataquis Co.: Foxcroft, *G. B. Fernald 161* (GH), *Fernald 319* (GH). Washington Co.: West Sidney, *Hyland 115* (MAINE). NEW HAMPSHIRE: Coös Co.: Pike pond, Stark, *Pease 23778* (GH).

2. **R. palustris** Marshall, f. **inermis** (Regel) stat. nov.

R. hudsoniana Thory ex Red. Roses **1**: 95 (1817).
R. hudsoniana salicifolia Thory ex Red. Roses **1**: 95 (1817).
R. carolina salicifolia Seringe ex DC. Prod. **2**: 605 (1825).
R. carolina L., var. *inermis* Regel. Tent. Ros. Mon. 78 (1877).
R. carolina inermis Schuette. Am. Ass. Adv. Sci. **46**: 279 (1898).
R. palustris Marshall, var. *inermis* (Schuette) Erlanson. Pap. Mich. Ac. Sci. Arts & Let. **5**: 90 (1925).

Individuals typical of *R. palustris* except that the floral stems are without armature. The form occurs infrequently throughout the range of the species.

Selected specimens examined. CANADA. ONTARIO: Muskoka Co.: Dorset, *C. Huber 5854* (as *R. palustris* Marsh., var. *inermis* (Schuette) Erl.) (GH). UNITED STATES. CONNECTICUT: Windham Co.: Plainfield, Wauregan, *Sheldon 537* (as *R. carolina*) (GH). FLORIDA: Putnam Co.: Welaka, *Laessle*, 26 June 1940 (FLAS). MAINE: Hancock Co.: Seal Harbor, Mount Desert I., *Redfield*, 21 Aug. 1890 (as *R. carolina*) (GH). MASSACHUSETTS: Berkshire Co.: Lenox, *Hoffmann*, 11 Aug. 1911 (as *R. carolina*) (GH). Norfolk Co.: Milton, *Churchill*, 17 July 1898 (as *R. carolina*) (GH). MICHIGAN: Charlevoix Co.: Boyne City, *Erlanson 5789/B* (as *R. palustris* var. *inermis*) (MICH). Cheboygan Co.: Lancaster Lake, *Ehlers 613* (as *R. carolina*) (GH). NEW YORK: Monroe Co.: Manitou Beach, *Killip 7843* (as *R. carolina*) (GH). Tompkins Co.: near Spencer Lake, *Muenscher & Bechtel 520* (as *R. carolina*) (GH). TENNESSEE: Unicoi Co.: Unaka Springs, *Lyle 19415* (TENN). VERMONT: Rutland Co.: East Wallingford, *Kent*, June 1897 (as *R. carolina*) (GH). WISCONSIN: Brown Co.: Blesh's Farm, *Schuette*, 22 June 1890 (as *R. carolina inermis*) (GH).

3. **R. palustris** Marshall, f. **alba** (Rafinesque) stat. nov.

R. carolina L., var. *alba* Rafinesque Ann. Gen. Sci. Phys. **5**: 214 (1820).

This form established by Rafinesque (1820) as a variety of *R. carolina* L. (Sp. Pl. **1**: 703, 1762) non L. (Ibid: 492, 1753) is nomenclaturally corrected in combination with the binomial for the eastern swamp rose. No white petaled specimens have been observed in this study.

4. **R. palustris** Marshall, f. **plena** f. nov.

R. carolina L., var. *pimpinellifolia* Rafinesque. Ann. Gen. Sci. Phys. **5**: 214 (1820) pro parte.
R. hudsoniana flore multiplici Thory. Prod. Gen. *Rosa* 147 (1820).
R. hudsoniana subcorymbosa Thory ex Red. Roses **2**: 109 (1821).
R. carolina L., var. *scandens* (Thory) Seringe ex DC. Prod. **2**: 605 (1825).
R. carolina L., var. *hemisphoerica* Seringe ex DC. Prod. **2**: 605 (1825).

A form of *R. palustris* with more than five petals in each flower. No specimens have been observed.

5. **R. Woodsii** Lindley, f. **hispida** f. nov.

R. adenosepala Wooton & Standley. Contr. U. S. Nat. Herb. **16**: 131 (1913) pro parte.
R. MacDougali x *R. ultramontana* Rydberg. N. Am. Fl. **22**: 523 (1918).

Hypanthia sunt glandulari-hispida et plerumque cum pedicellis glandulari-hispidis. Hypanthia are glandular-hispid and usually with glandular-hispid pedicels. Accompanying the glandular-hispid hypanthia and pedicels in the type are glandular leaflets, gland-tipped double serrations, glandular stipules, and hispid petioles.

HOLOTYPE: Near Helena, Lewis & Clark County, Montana. *F. D. Kelsey*, June 1892 (as *R. Fendleri*). Herbarium of Montana State College.
Selected specimen examined. MONTANA: Missoula Co.: Missoula, *Sandberg*, Aug. 1892 (as *R. pisocarpa*) (MIN).

6. **R. blanda** Aiton, f. **carpohispida** (Schuette) stat. nov.

R. blanda carpohispida Schuette. Proc. Am. Ass. Adv. Sci. **46**: 279 (1898).
R. blanda Aiton, var. *hispida* Farwell. Pap. Mich. Ac. Sci. Arts & Let. **2**: 25 (1923).

Rosa blanda which has glandular-hispid hypanthia and pedicels. The floral stems may be somewhat bristly. Although this description approaches that for the individuals intermediate between *R. blanda* and *R. palustris*, the forma is known to occur north of the range of *R. palustris* on the Gaspé, Quebec (Erlanson 1934).

Selected specimens examined. MAINE: Penobscot Co.: Greenbush, near Cardville, *Hyland 816* (as *R. blanda*, var. *hispida*) (MAINE). MICHIGAN: Houghton Co.: Grand Traverse Bay, *Richards 3644* (as *R. blanda*, var. *hispida*) (MAINE). MINNESOTA: Houston Co.: near Bee, *Butters & Rosendahl 3827* (MIN). Rice Co.: 10 mi. w. Northfield, *Butters & Rosendahl 2897* (MIN). Saint Louis Co.: Duluth, *Lakela 1482* (as *R. suffulta*) (MIN). Yellow Medicine Co.: Granite Falls, *Moyer 358* (as *R. humilis*) (MIN). WISCONSIN: Ashland Co.: 3. Ashland, *Richards 3402* (as *R. blanda*, var. *hispida*) (MAINE). Door Co.: Little Sturgeon Bay, *Schuette*, 17 Aug. 1891 (as *R. humilis* x *R. blanda*) (US).

7. **R. arkansana** Porter, f. **alba** (Rehder) comb. nov.

R. pratincola Greene, f. *alba* Rehder. Mitt. Deutsch. Dendr. Ges. 1910 (19): 252 (1911).
R. arkansoides Schneider, f. *alba* Schneider. Ill. Hand. Laubh. **2**: 971 (1912).
R. heliophila Greene, f. *alba* Rehder. Mitt. Deutsch. Dendr. Ges. 1915 (24): 222. 1916.
R. suffulta Greene, f. *alba* Rehder. Journ. Arn. Arb. **3**: 17. 1921.

Since the pubescent leafed variation (= *R. suffulta* Greene) of this species is not considered specifically distinct, the white petaled form is combined with *R. arkansana*.

8. **R. arkansana** Porter, f. **plena** f. nov.

Forma ultra quinque petala in florem. A form typical of *R. arkansana* except that as many as twenty petals are found in a single flower.

HOLOTYPE. The form is known only from one locality, Woodrow, Saskatchewan and has been distributed by P. H. Wright. Individuals have been planted at The Blandy Experimental Farm, Acc. No. 12876–54 (*Lewis 2310*). Herbarium specimens are deposited in the U. S. National Herbarium (holotype) and the Bailey Hortorium.

9. **R. arkansana** Porter, f. **setulosa** (Cockerell) comb. nov.

R. pratincola setulosa Cockerell ex Daniels Fl. Bould. Colo., Univ. Mo. Stud. Sci. Ser. 11 (2): 148. 1911.
R. suffulta Greene, f. *setulosa* Cockerell. Torreya **18**: 179 (1918).

The form has glandular-hispid hypanthia and usually glandular pedicels. The isotype was collected by Cockerell at Boulder, Boulder County, Colorado.

Selected specimens examined. COLORADO: Boulder Co.: Boulder, *T. D. A. Cockerell* (as *R. suffulta setulosa*) ISOTYPE (US). El Paso Co.: 5 mi. from Colorado Springs, *Penfound*, 18 July 1924 (COLO). Larimer Co.: Fort Collins, *Harrington 3262* (COLO). MONTANA: Big Horn Co.: 6 mi. s. Pryor, *Charff*, 10 June 1953 (MONT).

10. **R. carolina** L., f. **plena** (Marshall) stat. nov.

R. pennsylvanica plena Marshall. Arb. Am. 136 (1785).
R. parviflora pleno Ehrhart. Beitr. Nat. **4**: 21 (1789).
R. pennsylvanica var. *flore pleno* Andrews. Roses **2**: No. 102 (1828).
R. caroliniana var. *flore pleno* Andrews. Roses **2**: No. 104 (1828).
R. carolina conglobata Trattinick. Rosac. Mon. **2**: 156 (1823).
R. parviflora (*flore multiplici*) Thory ex Red. Roses No. 11 (1824).
R. humilis Marshall, var. *plena* Best. Journ. Trent. Nat. Hist. Soc. **2**: 1 (1889).
R. carolina L., var. *plena* (Marshall) Lynes. Baileya **3**: 58 (1955).

First described in the eighteenth century, the double petaled form of *R. carolina* has recently been nomenclaturally revised by Lynes (1955). In this study the rare variation is reduced to forma status.

11. **R. acicularis** Lindley, subsp. **acicularis**, f. **alba** (Nakai) comb. nov. *R. acicularis* Lindley, var. *Gmelini* (Bunge) Meyer, f. *alba* Nakai. Bot. Mag. Tokyo **30**: 241 (1916).

Among the many specimens of this subspecies examined from Europe and Asia, only one had entirely white petals rather than the typical pink. The material was collected in Tobolsk, Omsk R. S. F. S. R. (LE). Nakai (1916) cited the following localities: "Ham-gyŏng austr.: Atok-ryŏng (*Nakai 1825*) Cho-tyŏng-ryŏng (*Nakai 1569*)."

12. **R. acicularis** Lindley, subsp. **Sayi** (Schweinitz) Lewis, f. **plena** f. nov.

Forma ultra quinque petala in florem. A form typical of *R. acicularis* subsp. *Sayi* (Lewis 1957b) except that as many as fifteen petals occur in each flower.

HOLOTYPE. The form is known from only one locality, Moose Range, Saskatchewan. Herbarium specimens from plants growing at The Blandy Experimental Farm (Acc. No. 13386-56) are deposited in the U. S. National Herbarium (holotype) and the Bailey Hortorium.

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College Herbarium (MONT); University of Tennessee Herbarium (TENN); and the U. S. National Museum, Smithsonian Institution (US).

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NOTES ON NEARCTIC HEPATICAE VI. PHYTOGEOGRAPHICAL RELATIONSHIPS OF CRITICAL SPECIES IN MINNESOTA AND ADJACENT AREAS OF THE GREAT LAKES

R. M. SCHUSTER

(Concluded from p. 234)

(7) APPALACHIAN SPECIES OCCURRING NORTHWARD TO THE LAKE SUPERIOR REGION AND NEAR OR IN THE DRIFTLESS AREA

A number of species show this distribution pattern, *Diplophyllum apiculatum* (Fig. 13) and *Mannia rupestris* (Fig. 17) being perhaps typical. In both cases the population occurring near Lake Superior is somewhat disjunct, and represents the outlying population. A comparison of the distribution of the Appalachian endemic, *Diplophyllum apiculatum*, with that of another species of presumably Appalachian origin, *Tsuga canadensis*, is not without validity. The occurrence of such species of temperate occurrence around the shore of Lake Superior (and to the south in and near the Driftless Area), strongly suggests that the bulk of the distribution of these species is restricted to nonglaciated areas, with the restricted range around Lake Superior due to post-Pleistocene migration northward from a Pleistocene refugium in the Driftless Area. This thesis will be examined in more detail in the summation.

Diplophyllum apiculatum (Evs.) Steph. (Fig. 13). This common, essentially Appalachian species occurs from southern Maine to the southern edge of the Appalachian upland, south to northern Alabama and Mississippi (unpublished collections of the writer), and recurs westward sporadically to the Ozarks. It has evidently been able to push north from the glacial boundary to only a slight degree, and has been equally unable to invade the Atlantic Coastal Plain. The range is not unlike that of *Asplenium cryptolepis* (see Fernald, 1935, Map 5).

An old report from Quebec needs verification and seems unlikely. The report of the species from the coast of Hudson Bay (Wynne and Steere, 1943) is, in the light of our present knowledge, almost certainly erroneous.

The few stations in the Lake Superior area (one each in Wisconsin and Michigan), and that at Taylor's Falls, Minn., just north of the Driftless Area, are possibly derived from a population which originated in the Driftless Area. It is perhaps not entirely fortuitous that the northwestern range of *Tsuga canadensis* closely parallels the range of the *Diplophyllum*.[9]

Mannia rupestris (Balb.) Frye and Clark (Fig. 17). This species, unlike the preceding, is strongly restricted to calcareous rocks. It occurs in the unglaciated Appalachian Plateau and in the Ozarks, apparently in the few places where calcareous rocks occur, and from central New York (Schuster, 1949) and southern Ohio south to Tennessee, and to Linville Caverns, North Carolina. It is frequent in, and at the periphery of, the Driftless Area, in Illinois, Iowa, Wisconsin and Minnesota. Two stations occur on the Lake Superior margin in Michigan. Additional isolated stations occur in the Gaspé, in Vermont, and in Ontario. However, the only points at which the species occurs with any abundance are in and near the "Driftless Area," and north of the unglaciated plateau.

As is quite evident from map (Fig. 17), the post-Pleistocene range of this species must be regarded as derived, by limited northeastward dispersal, from Pleistocene and probably pre-Pleistocene centers in the Driftless Area, and in the unglaciated Appalachian Plateau. The rarity in the latter appears chiefly a result of the very localized occurrence of suitable, moist and calcareous sites in this region. This distribution pattern should be compared with that of *Frullania bolanderi* (Fig. 12) since it gives us a partial model for an explanation of the eastern post-Pleistocene range of that species. The same general northeastward, and never northwestward, post-Pleistocene "drift" is observable. This is easily understandable on the basis of the mesophytic nature of the

[9] The preceding discussion of *Diplophyllum apiculatum* was written three years before the species was actually found in the Driftless Area. In June, 1957, the species was found to be abundant on damp, sandstone rocks, associated with *Lycopodium selago* var. *patens*, at Rocky Arbor Roadside Park, northwest of Wisconsin Dells, Juneau Co. To one who had never previously collected in the Driftless Area, the consociation of species there was very suggestive: the Hepaticae included only species with a wide range in medium to high elevations in the Southern Appalachian System, among them *Lophozia silvicola*, *L. incisa*, *Tritomaria exsecta* and *exsectiformis*, *Lepidozia reptans*, *Calypogeia neesiana* s. str., *Geocalyx graveolens*, and such mosses as *Diphyscium sessile*. The entire hepatic flora thus gave the distinct impression of species which are widespread at higher elevations in the Blue Ridge system, as well as northward.

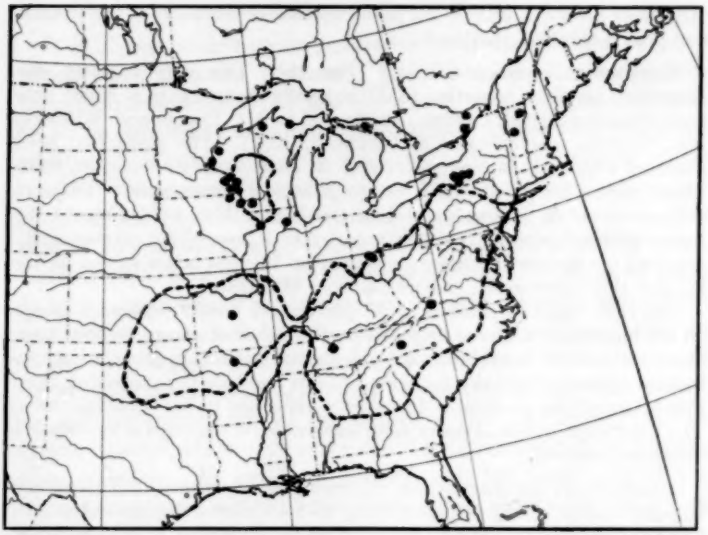

Fig. 17. North American range of *Mannia rupestris*. Within the dotted line the Ozarkian-Appalachian region that has not been submerged nor glaciated since the Paleozoic, and the Driftless Area.

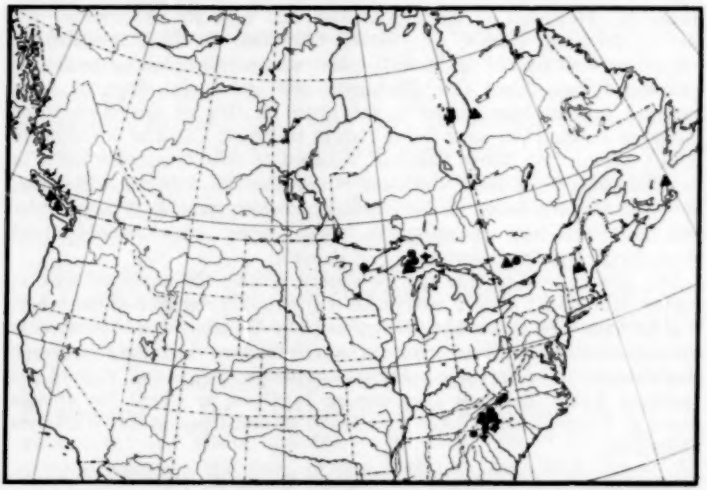

Fig. 18. Range of *Marsupella paroica* (dots), *M. sparsifolia* (triangles) and *Solenostoma appalachianum* (plus marks). Not all Appalachian stations of the latter drawn in; for its distribution see the text.

Hepaticae involved, and of the post-Pleistocene extension of the prairie, and prairie habitats, eastward.

Marsupella paroica Schuster (Fig. 18). This very recently distinguished species (Schuster, 1957) is locally common in a small area from Brasstown Bald, Georgia, northward to Mt. Rogers and Whitetop Mt., Virginia (see Schuster & Patterson, 1957). The plant had been confused with both *M. emarginata* and *M. sparsifolia* (see Schuster, 1953, where reasons are given why it cannot go into *M. emarginata*). Disjunct stations occur in Minnesota and in the Huron Mts. of Michigan; the former station has been previously reported as *M. sparsifolia*, an essentially arctic-alpine species (triangles on map, Fig. 18); the latter served as the basis of the report of *M. emarginata* from Michigan.

The Lake Superior stations of *M. paroica* are hardly explicable except on the basis of post-glacial dispersal northward from an unglaciated area. Since the species is evidently an old endemic of the unglaciated Appalachian plateau, the Lake Superior stations must be derived either from this latter center or from a Pleistocene refugium in the Driftless Area. The latter explanation appears more reasonable on the basis of the relative distances involved.

Solenostoma appalachianum Schuster (Fig. 18, crosses). This species appears to show a very definite affinity to *Solenostoma monticola* (Hattori) comb. n.[10] and is perhaps to be regarded as a vicariad of this Japanese species. Its relationships are discussed in Schuster (1958a). The original collections of *S. appalachianum* were made by the writer in 1953–54 in two localities: Neddie Creek, a small tributary of the Tuckaseegee R., Jackson Co., North Carolina, and near the Whitewater R., east of Jocassee, Oconee Co., South Carolina. In 1957 two further collections were made. In June the plant was collected, with capsules, at Pictured Rocks, Alger Co., Michigan, just above the shore of Lake Superior, and in July-August in the upper reaches of the Whitewater Gorge, in Jackson Co., near Beech Gap in Haywood Co., and in Cullasaja Gorge, Macon Co., North Carolina; subsequent collections were made in the Chattooga R., in both North and South Carolina, and in n.e. Georgia; the plant also was found in Big Creek, in n.e. Georgia. It is noteworthy that the Appalachian stations all lie in the "coves," where the old Mixed Mesophytic Forest, or derivatives of it occur.

The distribution of this species closely follows the same pattern as that of *Marsupella paroica*, except for a generally lower altitudinal range. It is perhaps significant that this species, like *M. paroica*, is a pioneer on non-calcareous rocks, therefore could have readily survived the Pleistocene glaciation on the damp, non-calcareous sandstone ledges and walls of the Driftless Area. Habitats very similar to those in which the species grows at Pictured Rocks have been found several times in the Wisconsin Dells area.

[10] *Jungermannia monticola* Hattori, Bull. Tokyo Sci. Mus. 11: 33, 1944.

DISCUSSION AND SUMMARY

It is always tempting to generalize from distribution patterns which show unusual features. By a process of conscious or unconscious selection it is also often possible to misplace emphasis, or to derive unwarranted conclusions. Added to this are the additional dangers imposed by a fragmentary knowledge of the range of the species (the well-known "distribution of collectors" phenomenon), leading to erroneous conclusions, as, for example that of Steere (1937) with respect to some of the so-called "Cordilleran" relicts of the Lake Superior regions. In spite of these dangers, study of the present ranges of plants remains a fascinating, but somewhat hazardous occupation. Since practically all of the extant generalizations, valid and invalid, with respect to the distribution of temperate and boreal North American plants are derived from study of the ranges of the Tracheophytes, the present contribution may serve to add significantly to the available evidence. As has been pointed out, the small size of the *Hepaticae*, which is surely related to their ability to survive in microhabitats, together with their great genetic stability (partly a consequence of their high incidence of vegetative reproduction) makes them an ideal group from the point of view of phytogeographical studies.

Admitting the hazards involved in generalizing from a limited number of selected species, the following tentative conclusions appear warranted. (1) There is a distinct, if somewhat tenuous, connection between the "old" flora of the unglaciated Appalachians and that of the Driftless Area (Fig. 13, 17). Perhaps through the latter there is an even more tenuous connection with the flora of Lake Superior, presumably the consequence of recent migration from a Pleistocene refugium in the Driftless Area (Figs. 13, 18). (2) There is a definite floristic connection between the Driftless Area and Lake Superior. *Frullania bolanderi* (Fig. 12) and *Mannia pilosa* (Fig. 16) serve to demonstrate this connection, and the range of the latter appears to establish a connection between the Lake Superior flora and that of the Arctic. Parallelisms in the Angiosperms and Pteridophytes are not unknown. (3) There appears to be a striking, if tenuous, connection between the flora of the Driftless Area and the Arctic, as demonstrated by *Athalamia hyalina* (Fig. 15). A close parallel

has been pointed out in the Angiosperms by Rosendahl (1947), in *Chrysosplenium iowense* Rydb., occurring peripheral to the Driftless Area in n.e. Iowa, again in Alberta, and in the high North American Arctic. (4) A pronounced connection between the Driftless Area, the Great Lakes region, and the far western flora is evidenced by the distribution of *Frullania bolanderi* (Fig. 12). The distribution of the herbaceous angiosperm, *Mertensia paniculata*, is s[illegible]atively similar.

The preceding c[illegible]ses, each involving the Driftless Area, are as a whole suggestive. Of these, the most meaningful perhaps is that of the corticolous species, *Frullania bolanderi* (Fig. 12). In this case, at least, the distribution in the east impinges only on one area where the species could have survived the Pleistocene glaciation, in other words, the Driftless Area. Thus there appears to be demonstrated a distinct connection between the flora bordering the Lake Superior region, and the much warmer Driftless Area. Among the Angiosperms, such cases, although rare, are also known (*Mertensia paniculata, Abies balsamea, Potentilla tridentata, Primula mistassinica, Populus balsamea, Thuja occidentalis*, etc.). Added to this is the fact that there are occasional species, of temperate and largely Appalachian, or Appalachian-Ozarkian range, which have attained the southern edge of the Lake Superior area, and occur in, or near, the Driftless area as well (Figs. 13, 17, 18). From this the conclusion can hardly be avoided that, in some fashion or another, the Driftless Area has served as a refugium for some of the plants, otherwise unknown from the Midwest, which have in post-Pleistocene times invaded the Great Lakes Area. In this connection, one must consider the range of the largely Cordilleran *Mertensia paniculata*, known from stations in northeastern Iowa, and southeastern Minnesota; the range of *Primula mistassinica*, known i.e., from a station in the unglaciated portion of Illinois; and the range of *Potentilla tridentata*, known i.e., from a station in southeastern Minnesota at the periphery of the Driftless Area, in Houston Co. All three species are common around Lake Superior. Additional examples appear unnecessary.[11] By this the writer would not try to deduce

[11] There are also a host of "relicts" found in the glaciated Mississippi River-St. Croix River valley region, running northward from the Driftless Area towards the Lake Superior region. Among them are *Primula mistassinica* (near Stillwater, Minn.), *Streptopus roseus* var. *longipes* (Fern.) Fassett (Taylors Falls, Wisc.), *Dryopteris fragrans* var. *remotiuscula* Komarov (St.

a wholesale revegetation of the Great Lakes Area, from a hypothetical refugium in the Driftless region. However, it is probable, from the range of such arctic-alpine species as *Athalamia hyalina*, *Mannia sibirica* and *pilosa*, and of such Cordilleran species as *Asterella saccata*, that such "rigid" species, of relict distribution regionally, were forced this far southward during the time of the Pleistocene glaciation. That they were not, in all cases, able to migrate northward recently to the Lake Superior region (as, for instance, in the case of *Asterella saccata* and *Athalamia hyalina*) does not materially alter this fact. The only other explanation, that the ranges of these species in the "Driftless Area" are the result of chance post-Pleistocene migrations would imply too fortuitous a series of coincidences to warrant serious consideration. The writer would therefore suggest a serious re-appraisal of Fernald's (1925) hypothesis that the Driftless Area served as a possible refugium, from which some of the disjunct Great Lakes vegetation could have been derived. The argument against this by Fassett (1931) based in part on the fact that the Cordilleran-Lake Superior *Rubus parviflorus* does not occur in the Driftless Area is not insurmountable, especially in view of the fact that another of the Cordilleran-Lake Superior species (*Mertensia paniculata*) does still survive in n.e. Iowa at the borders of the Driftless Area. The absence of specific species from the "Driftless Area," which are, however, characteristic of the Lake Superior region, proves nothing.[12]

In the case of the larger herbs, or shrubs (such as the *Rubus*), and of trees, which are exposed to the macroenvironment, survival in the Driftless Area, especially during the thermal maximum, is scarcely to be expected. Smaller herbs (such as *Mertensia*) or even more likely, small cryptogamic plants (such as *Hepaticae*),

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Croix Falls, Wisc.), *Lycopodium selago* var. *patens* (Beauv.) Desv. (Minnesota R. near Mankato and near St. Paul, Minn.), *Scirpus caespitosus* var. *callosus* Bigel. (Scott Co. and Ramsey Co., Minn., in and near the Minnesota R. valley). The occurrence of these plants as relicts in the region between the Lake Superior shore (where they are common pioneer or near-pioneer plants), and the Driftless Area (where they are now unknown, except for the *Primula*), suggests that they may be the rear-guard of a considerably larger series of species which at one time may have migrated northward from the Driftless Area to the shores of Lake Superior. The inverse explanation: that they are recent migrants, southward from the Lake Superior shore region, appears highly improbable.

[12] Deevey (1949, p. 1391) warned specifically against this type of negative reasoning, stating: "There is probably no field of scholarly activity where it is so dangerous, and at the same time so tempting, to reason from negative evidence, as biogeography."

which can survive in restricted microenvironments appear more able to withstand major climatic changes, and appear to have survived in the Driftless Area in larger numbers. This concept receives some indirect support from the fact that the *Hepaticae* with arctic and/or Lake Superior affinity and/or Cordilleran affinity (*Mannia sibirica, M. pilosa, Athalamia hyalina, Asterella saccata*) are all members of the order *Marchantiales*, suborder *Marchantiinae*. The *Marchantiales*, of all the *Hepaticae*, are the only ones with a well-developed xeromorphic structure, adapted to long unbroken periods without available water. This is to be considered in the light of the fact that of the 175 species of Hepaticae found in Minnesota, less than 10% belong to the suborder *Marchantiinae*. Yet no arctic-alpine members of the Lake Superior flora, belonging to the other, less xeromorphic groups, occur today in the Driftless Area. Considering some of the above distributional anomalies, which have received far from satisfactory explanations, the earlier suggestion of Fernald (1925) becomes more plausible than his more recent (1935) hypothesis that a "nunatak" area at the head of Lake Superior served as a refugium during glacial times.

The above interpretation of the role of the Driftless Area in the vegetation of the western Great Lakes Area is also supported by other recent sources which have not been drawn on in the foregoing discussion. For example, Braun (1950, p. 522–523) states that "The development of the Beech-Maple Forest [of the "Glaciated North"] was not the result of uninterrupted migrations from south of the Wisconsin glacial border. The aspect of mixed forest communities of ravine slopes, and the nature of the soil of the Driftless Area and adjacent very old drifts to the west suggest that this hilly area may have been a Pleistocene refugium for an attenuated mixed mesophytic forest which was isolated hereabouts in late Tertiary time, or at latest, in pre-Wisconsin time. From this refugium, early post-Pleistocene migration took place. This is indicated by the early appearance of *Fagus* and *Tilia* in records of nearby bogs. . . ." Miss Braun concludes, therefore, that "Thus two migrations, one from the south and one from the Driftless Area, met to the north of the Prairie Peninsula," leading to the present distribution of the Beech-Maple forest. Implied in this is a much further westward oc-

currence of Beech during the "mid-postglacial humid, warm period" with subsequent curtailment of its range during the subsequent xerothermic period. During this period, also, a large variety of the larger shrubs that may have survived in the Driftless Area, such as *Rubus parviflorus*, may have suffered extinction in the Driftless. According to this interpretation of Braun, "The Maple-Basswood Forest is . . . at least in part postglacial in origin. It appears to have been derived by climatic modification of the late Tertiary or interglacial forest of the Driftless Area. . . ." Such an interpretation of postglacial migration outward of various vegetational elements has also been used to explain the existing range of various other species. Thus McLaughlin (1931, p. 286) has suggested that *Hypericum kalmianum*, a slender shrub up to 6 dm. high, endemic to the Great Lakes, survived the Pleistocene in the Driftless Area, migrating eastward during the early postglacial period along the margins of the glacial lakes. A similar explanation could also be advanced for the distribution of the very distinctive Great Lakes endemic, *Cirsium pitcheri*, which today is confined to the shores of Lakes Michigan, Huron and Superior.

The above conclusions, with respect to the role played by the Driftless Area in the revegetation of the Lake Superior region, stand directly opposed to those recently expressed by Abbe (in Butters & Abbe, 1953, p. 69). Abbe, indeed, goes so far as to consider the presumed migration of species from the Driftless Area northward to the North Shore of Lake Superior as requiring "far more in the way of botanical legerdemain" than the migration patterns he postulates. However, it must be emphasized that Abbe dealt with only the Tracheophytes, and largely with the Angiosperms. The presence in the Driftless Area of arctic and "Cordilleran" elements, as regards the Angiosperms, has been known for a long time (the case of *Rhododendron lapponicum*) and has been confirmed by recent work [Rosendahl (1947) *Chrysosplenium iowense* and *Sedum rosea;* Williams (1937) *Mertensia paniculata*]. This lends credence to the idea (Fernald, 1925) that the Driftless Area played some part as a source of some of the local populations of otherwise arctic and Cordilleran species now occurring around Lake Superior, and in the area to the north of it.

Abbe (loc.cit., p. 70), reviews the evidence against considering the north shore of Lake Superior, or the Keweenaw Peninsula, as "refugia." With this evidence, there is no valid basis for argument. However, Abbe also discards the idea of Fernald (1925) that some of the relict species (and specifically the "Cordilleran" ones) could have survived in the Driftless Area, and migrated in the post-glacial period to their disjunct stations in the Great Lakes. He states: "It becomes necessary, if a nunatak theory is to be maintained as a philosophical necessity, either to relegate such refugia to still unexplored areas or to retreat southward to the Driftless Area. Either procedure demands that the rarities of today migrate across a terrain already heavily mantled by vegetation. It is far more reasonable to recognize the limitations of these species which restrict them to migration under the more favorable conditions for dissemination found in a periglacial zone . . . or along the strand and shore rocks and cliffs of the glacial lakes." Such an explanation, undoubtedly, holds for the majority of widespread plants today found around the shores of the Great Lakes. However, a question remains as to whether it applies to the so-called "rigid" species (*sensu* Hultén), whose ability to compete and migrate actively appears to be exceptionally low or to such forest species as *Frullania bolanderi*. The majority of the so-called disjuncts, or "critical" species, are, to a greater or lesser extent, rigid species, as was emphasized by Fernald. It is in these cases, where it is difficult to visualize fluctuating and migrating populations rapidly extending their range in an east-west or west-east direction, where the closely adjacent Driftless Area may acquire some significance as a "refugium."

The preceding discussion leaves unanswered the question of why there is such a marked disjunct element of arctic species around the shores of Lake Superior. The first 15 examples cited (Figs. 1–10) can be materially supplemented, and represent only a portion of the arctic and arctic-alpine species of *Bryophyta* known from the Lake Superior region. The paper by Steere (1937) lists a series of equally interesting disjunct arctic mosses and that by Thomson (1954) an impressive list of arctic and "high arctic" lichens. This arctic flora can be very simply explained as a relict or "old" flora, left behind during the immediate post-glacial

period, in a locally favorable area. The high incidence of arctic species around Lake Superior, and the much lower incidence of them in the rest of the Great Lakes Region supports this simple explanation. Lake Superior, the deepest of the lakes, is also by far the coldest, with the slightest winter-summer fluctuation in temperature. As a consequence, a narrow, permanently treeless, barren border exists, extending inward for only a few score yards (and often to a much lesser extent), and up for 10–50 feet in elevation above the Lake (rarely much higher), whose existence depends on the cooling effect of Lake Superior. This narrow strip has been presumed to represent a microclimatically (and, because of wave-action, in some cases a microedaphically) controlled Tundra strip (Schuster, 1953). The vegetation of this strip, involving the *Hepaticae* outlined (species 1–15), together with a series not discussed (*Lophozia kunzeana, L. hatcheri, L. groenlandica, L. grandiretis, L. alpestris, Tritomaria quinquedentata, Solenostoma sphaerocarpum, Tritomaria scitula, Lophozia lycopodioides, L. obtusa*, and others; for their regional distribution, see Schuster, 1953) compares favorably with that of the coastal portion of southern and central Greenland, as delineated by Bʺcher (1933) and of coastal Ellesmere Island (Bryhn, 1906–1907; Schuster, unpublished). The same rock-pool community, formed by *Scirpus caespitosus*, accompanied by *Polygonum viviparum, Potentilla tridentata, Pinguicula vulgaris*, characterizes some of the coastal portions of Greenland.[13]

It is therefore postulated that the disjunct species around the shore of Lake Superior may belong to two types (1) a series of "rigid" species, which may have survived the Pleistocene glaciation in the Driftless Area, and migrated northward the short distance involved to the Lake Superior shore, probably in the immediate postglacial period, and (2) a series of widespread arctic species, not found in the Driftless Area, which represent relicts of the immediate post-glacial period, when the Lake Superior area was invaded by a tundra-type of vegetation. The species of the first class persist in cool, moist microclimates, in many cases, in the Driftless Area, *in spite of the much warmer and*

[13] This affinity is even more strongly suggested by the fact that *Lophozia latifolia* Schuster (see Schuster 1953, 1954) known previously only from this arctic strip along the Lake Superior shore in Minnesota, has recently turned up in collections studied from Thule, Greenland, as well as in material from Swedish Lapland, from Alaska, and from northeastern Ellesmere Island.

drier general environmental conditions currently obtaining there. The species of the second class today persist around the Lake Superior shore because of the persistence there of localized tundra conditions in the vicinity of the spray zone of the lake.—DEPARTMENT OF BOTANY, UNIVERSITY OF MASSACHUSETTS, AMHERST, MASS.

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A NEW SPECIES OF VICIA (LEGUMINOSAE) IN FLORIDA[1]

R. K. Godfrey and Robert Kral

Vicia ocalensis Godfrey & Kral, sp. nov.—Perennis, caulibus ad 12 dm. altis, crebris et inter se multum innectentibus, prostratis vel suberectis. Caulibus ramisque insignite striatis, sparse pilosis. Foliis 4–6 foliolatis, plerumque 6. Foliolis 3–5 cm. longis 3–6 mm. latis, subtus sparse pilosis supra granularibus, linearibus vel anguste lineari-oblongis aut lineari-ellipticis, apicibus rotundo-mucronatis. Racemibus axillaribus, longi-pedunculatis, ferentibus ad 18 flores. Floribus 10–12 mm. longis. Pediculis calycibusque pilosis, lobis late deltoidis brevi-acuminatis. Petalis albis, quorum cacumina suffundurtur colore pallido-caeruleo ipsa lamina plus minusve suffusa omnino colore pallido-caeruleo. Leguminibus sparse brevi-pilosis aut glabratis, 4–4.5 cm. longis 6–8 mm. latis, ferentibus ad 8–12 semina.

Specimens examined: **Florida.** Marion Co.: Juniper Creek bank, Ocala National Forest, May 18, 1949, *Mather m-270* (flas); prostrate to climbing, succulent-leaved, blue-flowered plants, common on moist sands along creek through sandhills, toward east-central boundary of Ocala National Forest, April 7, 1957, *Kral 4569* (fsu); forming a dense entangled mat in roadside ditch bordering hammock, along Juniper Springs Creek, northeast of Juniper Springs, May 3, 1957, *Godfrey 55537* (fsu—Type).

Vicia ocalensis is apparently closely related to two other native *Vicia* species of the southeastern United States, *V. acutifolia* Elliott and *V. floridana* S. Watson. It is readily distinguished from both of the latter by its much more robust stature, its

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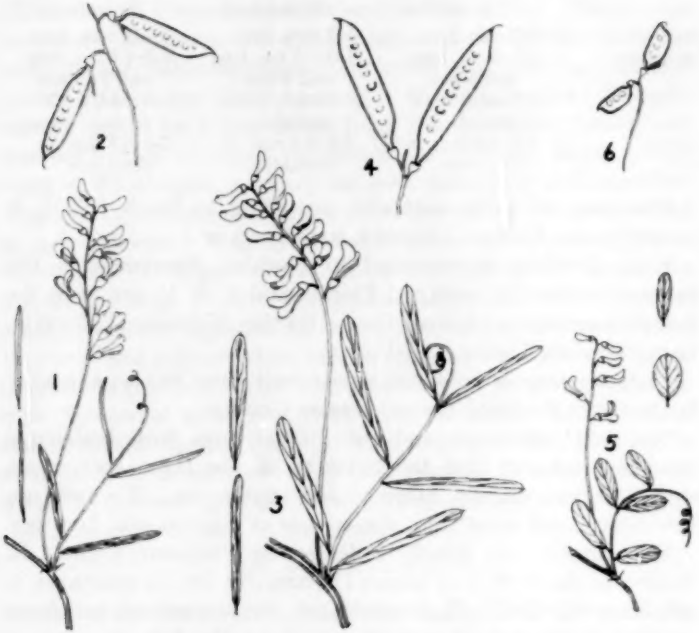

Fig. 1 and 2 Vicia acutifolia. Fig. 3 and 4 V. ocalensis. Fig. 5 and 6 V. floridana. All drawn to the same scale.

significantly larger leaflets, flowers, fruits, and seeds. Comparative distinguishing features are given in tabular form below. See also Figures 1–6.

	V. acutifolia	*V. floridana*	*V. ocalensis*
STEMS.	Usually not exceeding 8 dm. long.	Usually not exceeding 6 dm. long.	Mostly up to 12 dm. long.
LEAFLETS.	2–4, mostly 4, narrowly linear to linear, 1.5–3 cm. in length and 1–2 mm. in width.	4–6, mostly 4, linear-elliptic to suborbicular, mostly elliptic, 1.0–1.5 cm. in length and 3–5 (–8) mm. in width.	4–6, mostly 6, linear-oblong or linear-elliptic, 3–5 cm. in length and 3–4 (–6) mm. in width.
RACEMES.	2–12, mostly 8–10-flowered.	1–10, mostly 4–6-flowered.	12–18, mostly 15–18-flowered.

	V. acutifolia	*V. floridana*	*V. ocalensis*
FLOWERS.	8–9 mm. long.	5–7 mm. long.	10–12 mm. long.
LEGUMES.	2.5–3 cm. long and 5 mm. broad, 8–12-seeded.	1.0–1.5 cm. long and 5 mm. broad, 1–3-seeded.	4.0–4.5 cm. long and 7–8 mm. broad, 8–12-seeded.
SEEDS.	2.0–2.2 mm. in diameter.	2.0–2.5 mm. in diameter.	3.0–3.5 mm. in diameter.

The range of *Vicia acutifolia*, according to Small (1933), is coastal plain, Florida, Alabama, and Georgia.

Vicia floridana is restricted to Florida. Specimens in the herbaria of the University of Florida and F. S. U. are from the following counties: Alachua, Eustis, Hardee, Hillsboro, Lafayette, Levy, Marion, Taylor, and Volusia.

Vicia ocalensis is presently known only from the type locality in the Ocala National Forest, Marion County.

Our field experience and the limited data with herbarium specimen indicate that the habitats of the three species are closely similar, namely, moist to wet open areas. We have not yet encountered more than one species at a given site, however.

The authors are greatly indebted to Professor Francis R. Walton of the F. S. U. Classics Department for his assistance in preparing the Latin diagnosis.—DEPT. OF BIOLOGICAL SCIENCES, FLORIDA STATE UNIVERSITY.

ORANGE-YELLOW-FLOWERED CLAYTONIA VIRGINICA.—We are so accustomed to seeing the flowers of the Spring Beauty in various shades of rose, pink, or sometimes nearly white, that it comes as a shock to see plants of such a familiar species with orange-yellow flowers and reddish anthers. Yet ten to a dozen orange-yellow-flowered plants of *Claytonia virginica* have been found growing together with the usual color form, along the Susquehanna Canal in Maryland, by Mrs. George A. Elbert of New York City, and she has provided a specimen and photographs in color to prove it. The specimen was so carefully prepared that it retains the orange-yellow petal color, matching the 10 yr 8/10 moderate orange-yellow band on the Nickerson Color Fan. The veins of the petals are red, similar in color to the anthers.

In my own experience, I had not seen an orange-yellow-flowered

Claytonia and I wondered whether this find of Mrs. Elbert's was unique in the genus. A quick perusal of the literature shows that orange-yellow-flowered Claytonias are known. Nelson[1] described *C. aurea* [later[2] naming it *C. flava*, because *C. aurea* turned out to be a homonym] from Henry's Lake, Idaho, and Greene[3] named *Claytonia chrysantha* from Mount Baker in the state of Washington. I have not seen specimens of *C. flava* but isotypes of *C. chrysantha* do not show the yellow color attributed to it by Greene. Indeed, St. John[4] points this out and further states that there are no real differences between *C. chrysantha* and *C. lanceolata* Pursh. Nomenclaturally, this yellow-flowered plant has been regarded as a species, subspecies[5] and form.[4] However, not only are there known orange-yellow-flowered types in western North America but apparently *C. virginica* turns up with flowers of this color from time to time. In Bartonia,[6] Ball reported Spring Beauties with orange-colored flowers in abundance in a meadow near Quakertown, Pennsylvania. It would be interesting to know more about the geographical range of this color form.—R. C. Rollins.

Buchloë dactyloides in Illinois—Buffalo grass, one of the most famous and valuable native North American forage grasses, was an important constituent of the shortgrass prairies of the Great Plains over which vast numbers of bison formerly grazed. Its principal area of distribution extends from western Minnesota into western Canada and central Montana, and southward through eastern Colorado to Arizona, extending into western Louisiana, and northward to northwestern Iowa. It has recently been found in Peoria County, Illinois.

This plant is a stoloniferous perennial grass growing in characteristic colonies often forming a continuous turf of unusual toughness, the short stems rising to a height of a few inches and bearing curly leaves. In the fall it becomes dry and dull grayish green; in both the green and dry condition it is nutritious to

[1] Bull. Torr. Bot. Club **27**: 260. 1900.
[2] Univ. Wyo. Pub. Bot. **1**: 142. 1926.
[3] Leafl. West. Bot. **2**: 45. 1910.
[4] Res. Stud. State Coll. Wash. **1**: 97. 1929.
[5] Ferris in Abrams, Ill. Fl. Pac. States **2**: 122. 1944.
[6] Bartonia **7**: 22. 1915. I am indebted to Dr. John M. Fogg for telling me of this reference.

grazing animals. The thick turf was cut into blocks to build the walls of the "sod houses" of early settlers on the western prairies.

The phytogeographical significance of the discovery of *Buchloë dactyloides* growing spontaneously in Illinois is that it establishes the fact that this grass ranged at least as far eastward as west-central Illinois, where it is clearly a relict from early post-Pleistocene times. Its discovery here by Dr. Chase in 1956 certainly does not represent a recent extension of range. Although it is now known to occur in Illinois in only a single locality where it occupies a small area in a relatively undisturbed part of a cemetery, it is probable that this colony was only one among several or many others that persisted in Illinois possibly down to the nineteenth century. The fact is nevertheless rather remarkable that during one hundred and fifty years of intermittent but extensive botanical collection and exploration in Illinois, this plant has remained undetected until now. Its recent discovery shows again how nearly impossible it is to discover all the species of a region even after long study. In this particular instance this grass had been completely overlooked, even by the several discriminating resident students of the flora of central Illinois, including, among others, Frederick Brendel, the distinguished author of *Flora Peoriana*, who studied the botany of the Peoria district from 1852 to 1912, and Francis Eugene McDonald, who collected extensively in the same area from about 1880 to 1920. It remained for the veteran Illinois botanist, Dr. V. H. Chase, to discover this species in Illinois at a station about 400 miles east of its nearest known occurrence in northwestern Iowa.

The collection data of *Buchloë dactyloides* in Illinois are as follows: in Springdale cemetery, Peoria, Peoria Co., August 8, 1956, *V. H. Chase 14304*, apparently a relic on soil never in cultivation. Specimens have been deposited in the herbaria of the Smithsonian Institution and the University of Illinois.—G. Neville Jones, university of illinois.

Rorippa sessiliflora in Essex County, Massachusetts.—When checking over the Cruciferae in the herbarium of the Peabody Museum of Salem I found a sheet of an unfamiliar species collected in Salem by the Rev. John Lewis Russell in

1859 bearing the notation, "A weed in garden and seen there for many years past." The specimen had been given various identifications, all obviously wrong. Taking it to the Gray Herbarium I narrowed it down to *Rorippa* and with the aid of Dr. Reed Rollins finally matched it with *R. sessiliflora* (Nutt.) Hitch., a plant of the South and West. While made nearly a century ago this still appears to be the only New England collection of the species.—STUART K. HARRIS,
DEPT. OF BIOLOGY, BOSTON UNIVERSITY.

A NEW COLOR FORM OF SOLIDAGO SEMPERVIRENS.—**Solidago sempervirens** L., forma **citrea** Harris, forma nov. Ad formam typicam similis, sed floribus pallide citrinis. Like the typical form but the florets pale lemon yellow.

Any botanist finding this conspicuous color form growing with normal plants near the parking lot of the Crane Beach Reservation in Ipswich, Essex County, Massachusetts, where it is now abundant, would have no reason to suspect that it was not native to the area. However, this is not the case, the original source was in a different county.

A single plant of the color form was noticed in a colony of normal plants growing on open ground in Winthrop, Suffolk County, Massachusetts by Mr. Francis Wade in 1942. He dug the plant and moved it to his garden in Stoneham, Middlesex County, where it prospered and Mr. Wade divided it annually. When he moved to Ipswich, he took the clones with him and continued to divide them until he now has a considerable number. Seedlings coming up resembled the parent plant. Mr. Wade then gathered seed in his garden and scattered it on various areas about Ipswich where the typical form was growing. In a number of these areas the new form seems to be well established and its pale yellow heads contrast sharply with the deep yellow heads of the normal plants. More recently Mr. Wade has scattered seeds of the color form along the sides of the highway between Newburyport and Plum Island but to date none of these plants have flowered.

Mr. Wade brought me material of the new form in September of 1954 and I showed it to Dr. Reed Rollins of the Gray Herbarium. Suspecting that the plants might be polyploids because

of the head size and thickness of the leaves, he had Miss Ann Morrill make a cytological study of the material. The pollen proved to be normal and the chromosome number was normal for the species.

Material Studied: Massachusetts, Essex County: from clone of original plant, garden of Francis Wade, Ipswich, *S. K. Harris ,13982* 4 October 1957 (TYPE in GH; isotype in NEBC); garden, Ipswich, Francis Wade 20 September 1954 (NEBC); near parking lot of Crane Beach Reservation, Ipswich, *S. K. Harris 13872*, 27 September 1957 (NEBC). STUART K. HARRIS, BOSTON UNIVERSITY.

EVOLUTION OF FLOWERING PLANTS.—According to legend, the Ostrich, when frightened, buries its head in the sand, apparently reasoning that what cannot be seen or heard has no reality. In human affairs this is the sort of attitude that continually harks back to the "good old days," forgetting the open sewers, the tainted meat, and the little children choking with Diphtheria. Needless to say, there should be no tolerance, in Science, of Ostrich reasoning. In Biology, the increase of factual knowledge, in both the observational and experimental fields, of late years, has been truly remarkable. In many cases, however, theoretical considerations have not kept pace with the increase in factual data, with the unfortunate result that some biologists persist in trying to square the modern corpus of knowledge with theories that were none too happily contrived fifty or one hundred years ago. Indeed, perhaps the most serious deficiency in contemporary biology is the absence of a sober, impartial, encyclopedic, evaluation and correlation of the facts available in the fields of genetics, ecology, comparative morphology, and taxonomy.

A short time ago there was published a book entitled "Features of Evolution in the Flowering Plants."[1] The author is Ronald Good, a well known phytogeographer, and Professor of Botany at the University of Hull (England). On first glance, the book makes an extremely good impression, for it is simply and clearly written, and replete with examples and tastefully produced illustrations. A second look, however, shows that the book is fifty years out of date. The author has chosen to ignore most of the modern data of taxonomy, comparative morphology, and genetics. In doing so, he has not only denied himself the answers to many of his questions (or at least what answers may be available), but he has also denied himself the data necessary to frame his questions meaningfully.

As a plant geographer, the author seems to have picked up a nodding acquaintance with a great variety of species of flowering plants—and with a number of currently unpopular hypotheses about the mechanism of evolution. Unfortunately, it frequently appears that he does not have

[1] Longmans, Green & Co., London and New York, 1956, 30 shillings.

intimate, first-hand acquaintance with the data which he uses. What is worse, however, he seems not to have used all of the available sources of information. No discussion of the relationships of the monocotyledons and dicotyledons, for example, can have much significance if it ignores our present knowledge of the vegetative anatomy of the two groups—based particularly on the recent work of I. W. Bailey and his collaborators at Harvard, V. I. Cheadle at the University of California, and C. R. Metcalfe at Kew. Neither can any discussion of the interrelationships of the higher dicots have much relevancy unless it takes into account the work of A. J. Eames and his students at Cornell. Finally, any discussion of the evolution of the Compositae or Gramineae should consider the genetic studies of Babcock and Stebbins, and their respective collaborators, at the University of California.

Good's main contention seems to be that evolutionary thought is too much dominated by the results of statistical analyses of animal populations, or by *a priori* axioms, and not by demonstrable facts. It is true that much of our knowledge of the behavior of structural characters in populations is derived from the study of laboratory cultures of the fruit fly, Drosophila. One of the values of these tiny, bisexual, insects is their extremely short life span, usually completed within two weeks. It is perhaps frequently forgotten by students of genetics and evolution that Drosophila is biologically comparable only with annual plants which are obligately cross-fertilized—types which are generally considered to have reached the acme of specialization. They tend to forget that woody plants, biennial and perennial herbs, and self-fertile annuals—which account for the vast majority of flowering plants—may behave very differently, both as individuals and as populations. Modern studies have shown that, in the north temperate zone, up to 80 per cent of the species in a given plant community may have some propensity for vegetative reproduction under natural conditions. Of the 1,500 species of plants studied so far, 46 per cent seem to have some faculty for producing seed without the need for cross pollination. Finally, of the 15,000 species investigated, about 33 per cent seem to be involved in polyploidy. These are phenomena unknown in populations of Drosophila.

Good had an excellent idea, but he didn't carry through. There remains a need for an impartial examination of current evolutionary hypotheses. There is a fair amount of botanical evidence, experimental and historical, which bears on the origin of species and genera. This evidence does not seem to support the neodarwinian concept of natural selection. The origin of species, or of any other taxonomic category—as distinct from the behavior of specific characters—is a matter of history and experiment, not speculation. In the literature of botany and horticulture, which has been built up over the past two hundred years, there is a wealth of historical and experimental data about individual plants and populations. It is time these data were used.—GORDON P. DEWOLF, JR., CAMBRIDGE UNIVERSITY.

GRASSES NEW TO ILLINOIS AND THE CHICAGO REGION.—Specimens cited are in the herbarium of the Chicago Natural History Museum (F); herbarium of the Illinois State Natural History Survey, Urbana (ILLS); herbarium of University of Illinois, Navy Pier, Chicago (NP); and United States National Herbarium, Washington, D. C. (US).

Puccinellia distans (L.) Parl. New to Illinois. Many plants of this alkali-grass were found in the Proviso railroad yards at Northlake, Cook County, Illinois, June 19, 1957, *Glassman 4088* (NP), *Thieret 3534* (F, ILLS, US).

Bromus marginatus Nees. New to the Chicago region. This brome-grass was collected in a waste place near Hickory Road and Kedzie Avenue, Homewood, Cook County, Illinois, June 17, 1957, *Thieret 3503* (F, ILLS). *B. marginatus* has been collected apparently only once before in Illinois. Dr. J. R. Swallen has kindly sent us the data for this collection: Fox River valley near Elgin, [Kane County], June 30, 1916, *Benke 1340* (US).—JOHN W. THIERET AND SIDNEY F. GLASSMAN, CHICAGO NATURAL HISTORY MUSEUM, AND UNIVERSITY OF ILLINOIS, NAVY PIER, CHICAGO.

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